



# EV2274A Datasheet

V 4.2

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# Chapter 1 General Information

## 1.1 Introduction

VCU (Vehicle Control Unit) is the main controller for electric vehicles.

VCU receives sensor and driver input signals, such as pedal inputs, vehicle speed signals, and other inputs, manages the system energy, commands the driver demanded torque to powertrain, coordinates vehicle components, achieves fault diagnosis, and determines the overall vehicle drivability.

VCU plays a critical and supervisory role in the vehicle control network, or CAN bus-based network.

### 1.1.1 Functionality

EV2274A has the following functions:

Table 1 EV2274A Features

Feature
1 – Key switch (KEYON)
2 – Hardwire wakeup (DI21, DI22)
2 – Power supplies (BATT)
2 – High and low side power supplies
5 – 5V Outputs
3 – CAN Bus ports: CANA supports wake up at any frame, CANB supports wake up at specific frame
1 – LIN Bus port: supports wake up, only supports master mode
13 – Digital signal inputs: 7 channels active high, 6 channels active low
15 – Analog signal inputs: 5 channels of 0-5V voltage input, 2 channels of 0-5V resistance input, and 8 channels of 0-32V voltage input
5 – Frequency signal inputs
10 – High-side driver outputs: 2 configurable as PWM outputs
18 – Low-side driver outputs: 4 configurable as PWM outputs
Hardware watchdog
Default minimum task period: 1ms, can be customized and modified according to customer needs

### 1.1.2 Mechanical Properties

The housing of VCU is formed by aluminum die-casting and assembled with silicone rubber. There is no special treatment or plating on the outside of the housing, no sharp burrs and sharp edges. The nominal dimensions of the VCU housing are as follows (excluding the female end of the VCU connector, in mm):

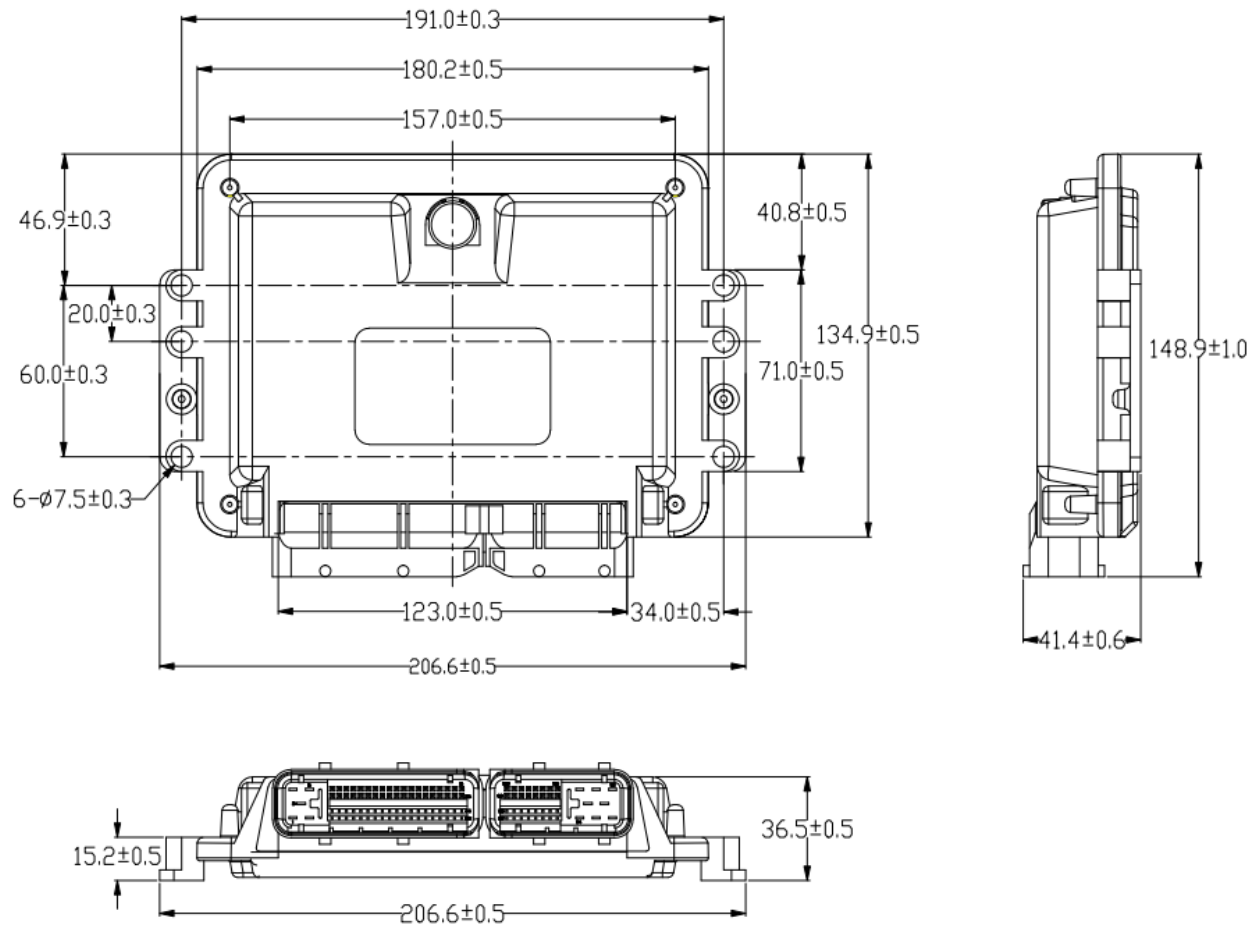


Figure 1 VCU Housing Size

The appearance of the housing is as follows:



Figure 2 VCU Housing Appearance

The screwdriver head used for disassembling the housing: Torx T15. The product identification label is affixed to the VCU housing, which contains the product identification code, customer information, date, batch number, serial number, etc.

### 1.1.3 Processor Specs

Table 3 Processor Specs

Feature	Detail
Micro Control Core	32-bit NXP SPC5744P
Maximum Frequency	200MHZ
Flash	2.5MB
SRAM	384KB
SPI Serial EEPROM	64KB
Floating Point Capability	Yes
SBC Microprocessor	MC33CFS6500

### 1.1.4 Recommended Software

<b>Controller</b>	EV2274A
<b>Main Chip</b>	NXP SPC5744P
<b>Integrated Development Environment</b>	S32DS_Power_Win32_v2017.R1_b171019
<b>EcoCoder Version</b>	EcoCoder-v2.9.12 R7 or newer
<b>EcoFlash Version</b>	EcoFlash-v1.1.6.7 or newer
<b>EcoCAL Version</b>	EcoCAL-V2.1.8.3 or newer

### 1.1.5 Power Supply

EV2274A requires 4 channels of continuous power supplies (pin1, pin3, pin116, and pin 119), and the VCU is powered on through the key switch (pin59).

Two 5A fuses, one in series with pin1 and pin3, and the other in series with pin116 and pin119 are recommended for EV2274A power supply.

### 1.1.6 Bootloader

This controller's bootloader supports CCP protocols by default.

## Chapter 2 Technical Performance

### 2.1 Electrical Characteristics

Item	Design Specifications
Operating Voltage	DC 12/24V (9~32V)
Operating Temperature	-40 °C ~ 85 °C
Working Humidity	0~95%, No Condensation
Storage Temperature	-40 °C ~ 85 °C
Quiescent Current	<1mA
Rated Power Consumption	3 W (Not Including Load)
Protection Level	IP67
Weight	≤ 700g
Controller Size	207×149×41mm
Material	Die-Cast Aluminum
Housing	Equipped with waterproof ventilating valve, good heat dissipation



## 2.2 Electrical Performance Standard

Item	Test Standard
Direct Current Supply Voltage	ISO 16750-2
Overvoltage (12V, High Temperature)	ISO 16750-2
Slow Decrease and Increase of Supply Voltage	ISO 16750-2
Superimposed Alternating Voltage	ISO 16750-2
Reversed Voltage	ISO 16750-2
Low Voltage Reset Features	ISO 16750-2
Low Voltage Start Features	ISO 16750-2
Open Circuit Tests – Single Line Interruption	ISO 16750-2
Open Circuit Tests – Multiple Line Interruption	ISO 16750-2
Short Circuit Protection	ISO 16750-2
Withstand Voltage	ISO 16750-2
Insulation Resistance	ISO 16750-2

## 2.3 Environmental Standards

Item	Test Standard
Waterproof (IP67)	IEC/EN 60529
Dustproof (IP67)	ISO 20653
Salt Spray Leakage Function and Corrosion Test	ISO 16750-4
Mechanical Shock Test	ISO 16750-3
Vibration Test	ISO 16750-3
Drop Test	ISO 16750-3
Temperature Shock	ISO 16750- 4
Electrical Operation at Circulating Ambient Temperature	ISO 16750-4
High and Low Temperature Operation Experiment	ISO 16750-4
High and Low Temperature Experiment	ISO 16750-4
Temperature and Humidity Cycle	IEC 60068-2-30
Constant Temperature and Humidity	ISO 16750-4

## 2.4 EMC Test Standard

Item	Test Standard
Voltage Transient Emissions Test	ISO7637-2
Conducted Emission (CE-V)	CISPR25
Conducted Emission (CE-C)	CISPR25
Radiation Emission (RE-ALSE)	CISPR25
Radiation Immunity Experiment (I/O)-ICC	ISO7637-3
Radiation Immunity Experiment (BCI-Substitution Method)	ISO11452-4
Radiation Immunity Experiment (RI)	ISO11452-2
Low Frequency Magnetic Field Immunity	ISO11452-8
ESD	GMW3097

## Chapter 3 Installation Requirements

It is recommended to install the VCU in the cabin. If the vehicle manufacturer wants to install the VCU at another location, the alternative installation location should be evaluated by Ecotron's engineers and the vehicle manufacturer's engineers.

The precautions for VCU installation are as follows:

1. The VCU and wiring harness installation should be firm and reliable, and there should be no looseness. Avoid supporting the wiring harness by VCU. At the same time, the arrangement of the VCU wiring harness should prevent and protect all wires in the wiring harness from damage due to wear and to overheat.
2. Avoid installing the VCU in places where dust is likely to gather. A large amount of dust accumulation will affect the reliability of the VCU.
3. Avoid installing the VCU in locations where the temperature of the housing itself may exceed 85°C. It should also not be installed in a location where the surrounding components transfer heat onto the VCU.
4. Avoid installing the VCU in locations where oil, moisture, and water droplets are likely to splash on it.
5. Avoid the possibility of additional mechanical shock and external impact due to the installation position and fixing method of the VCU and avoid installing the VCU at the resonance point of the car body.
6. Avoid installing the VCU where it may come into contact with the battery or other parts that are prone to seepage of acid and alkaline solutions and near the VCU power terminal.
7. Avoid installing the VCU near the positive terminal of the battery and the ignition power supply terminal where it might make contact.
8. VCU should be installed in the horizontal and vertical position according to the connector downwards and maintain a certain angle to prevent water from entering the connector. In the horizontal direction, the recommended installation angle is  $-170^{\circ}$  to  $-10^{\circ}$ , as shown in Figure 13 below. In the vertical direction, the recommended installation angle is  $-170^{\circ}$ ~ $-10^{\circ}$ , as shown in Figure 14 below.

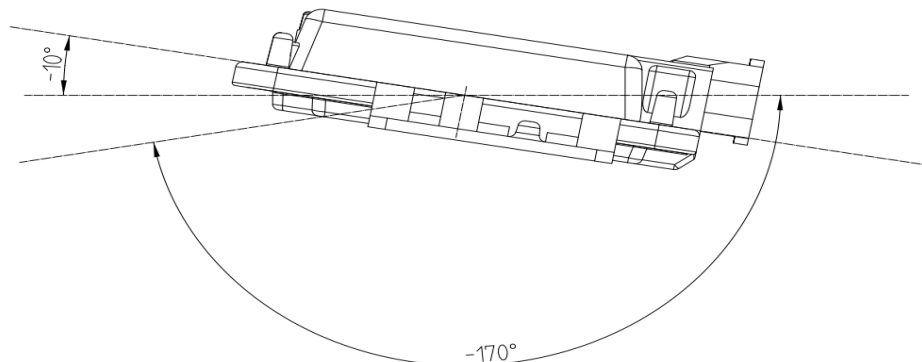


Figure 13 Horizontal Installation Angle

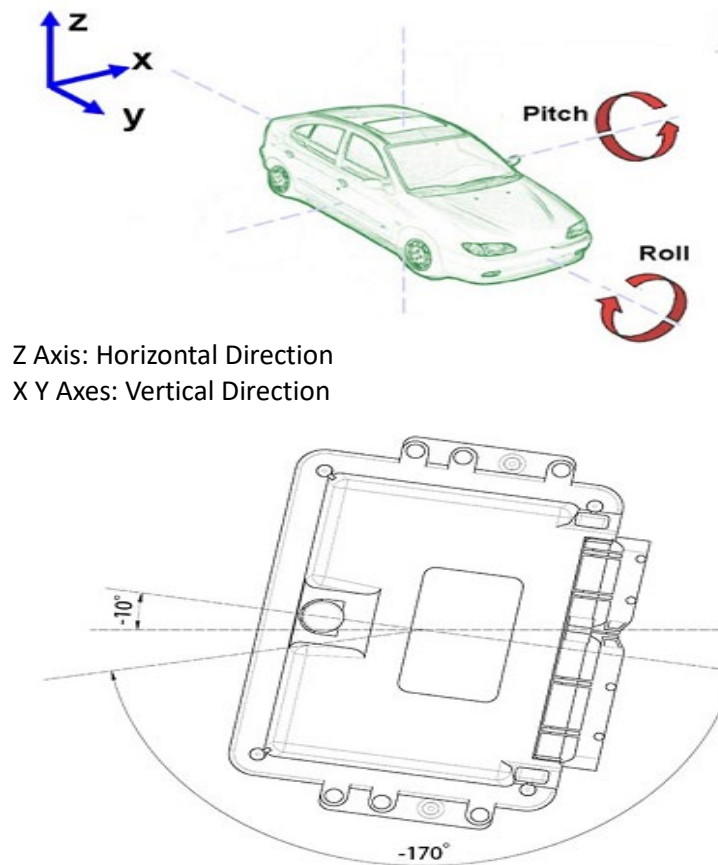


Figure 14 Vertical Installation Angle

Ecotron recommends using the six mounting holes on the VCU for installation. It is recommended to use metal materials such as aluminum alloys for the mounting bracket. The housing should have a reliable electrical connection with the vehicle body through the bracket. If other materials are used, the customer must ensure that they can meet the requirements of VCU for vibration, heat dissipation, temperature, EMC, etc. If there is any deviation, it needs to be confirmed with Ecotron.

The VCU connects to ground through the vehicle's body. The specific requirement is to directly connect the ground wire in the wiring harness to the vehicle's body and ensure reliable electrical connections.

9. Mechanical installation recommendations: (The user can modify depending on the vehicle)
  1. Recommended specification for installation bolts: M6 nut and bolt, bolt length of approximately 25mm.
  2. Recommended tightening torque for installation: 7 Nm.
  3. Recommended size and parameters for additional anti-vibration pads: inner diameter 6mm, outer diameter 20mm, thickness 15mm.